**SIR .CV .RAMAN COACHING CENTRE – IDAPPADI,SALEM -637101**

**Xll- PHYSICS [ FIRST VOLUME ] MODEL QUESTION PAPER- 2025**

**PREPARED BY Dr.G.THIRUMOORTHI,M.Sc,B.Ed,Ph.D ,PHYSICS**

**thiruphysics1994@gmail.com, 8610560810,8883610465**

**SECTION – A( 15 X 1 = 15 M_)**

**I.CHOOSE THE CORRECT BEST ANSWER**

1.Two identical conducting balls having positive charges *q1* and *q2* are separated by a centre to centre distance *r*. If they are made to touch each other and then separated to the same distance, the force between them will be
(a) less than before (b) same as before (c) more than before d) all

2. A toaster operating at 240 V has a resistance of 60 Ω. Its power is
a) 400 W b) 960 W c) 480 W d) none of the above

3.A non-conducting charged ring carrying a charge of *q*, mass *m* and radius *r* is rotated about its axis with constant angular speed ω. Find the ratio of its magnetic moment with angular momentum is

(a) $\frac{q}{m}$ (b) $\frac{2q}{m}$ (c) $\frac{q}{2m}$ (d) $\frac{q}{4m}$

4.Which of the following is NOT true for electromagnetic waves?. (a) it transports energy (b) it transports momentum (c) it transports angular momentum (d) in vacuum, it travels with different speeds which depend on their frequency

5.A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is
a) 0.83 b) 0.73 c) 0.53 d) zero

6. Rotor contains ……..windings
a) magnetic field b) electric field c) electromagnetic field d) both a and b

7.How many electrons make of 2 coulomb of charge ?
a) $12.5 \times 10^{18}$ b) $125 \times 10^{18}$ c) $-125 \times 10^{18}$ d) $0.0125 \times 10^{18}$

8. The frequency of the domestic AC supply is increased from 50–60 Hz to around ……?
a) 20–40 KHz b) 20–40 Hz c) 20–40 GHz d) 10–40 KHz

9.The Soft ferromagnetic materials are
a) Soft iron, b) Mumetal c) Stalloy d) all

10.The dimensional formula of permittivity in free space ?
a) [ $M^{-1} L^{-3} T^4 A^2$ ] b) [ $M^{-1} L^{-3} A^2$ ] c) [ $M^{-1} T^4 A^2$ ] d) [ $M^{-1} L^{-3} T^4$ ]

11.The instantaneous magnitude of the electric and magnetic field vectors in electromagnetic wave are related by
a) c = E / B b) E X B c) E -B d) all

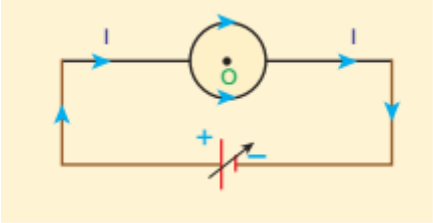
12.The dielectric strength Unit is

a) v/m b) c/m c) N/m d) $v/m^2$

13.The positive Thomson effect are

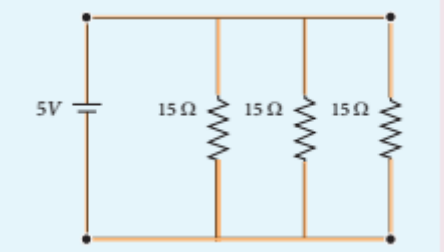
a) Pt b) Ag c) zn d) cd

14.What is the magnetic field at the centre of the loop shown in figure?




a) maximum b) minimum c) infinity d) zero

15. What is the current drawn out from the battery




a) 1A b) 2A c) 3A d) 4A

**SECTION – B ( 6 X 2 = 12 M_)**

**II.ANSWER ANY 6 QUESTIONS COMPULSORY Q.NO : 24.**

**16.**State Gauss law

17.What is thermistor

18.What is magnetic field?

19.What do you understand by self inductance of a coil? Give its physical significance.

20.Write notes on Ampere-Maxwell law

21.Compute the intensity of magnetisation of the bar magnet whose mass, magnetic moment and density are 200 g, 2 A m2 and 8 g cm–3, respectively.

22.A 200V/120V step-down transformer of 90% efficiency is connected to an induction stove of resistance 40 Ω. Find the current drawn by the primary of the transformer

23.What is meant by electrostatic energy density?

24.A copper wire of 10–6 m2 area of cross section, carries a current of 2 A. If the number of free electrons per cubic meter in the wire is 8 × 1028, calculate the current density and average drift velocity of electrons.

**SECTION – C ( 6 X 3 = 18 M_)**

**III.ANSWER ANY 6 QUESTIONS COMPULSORY Q.NO : 33**

**25.** Discuss the Hertz experiment.

26.An inductor of inductance L carries an electric current i. How much energy is stored while establishing the current in it?

27.Compare the properties of soft and hard ferromagnetic materials.

28.Explain in detail how charges are distributed in a conductor, and the principle behind the lightning conductor.

29. Explain the equivalent cell of a series and parallel cell network.

30.An electric heater of resistance 10 Ω connected to 220 V power supply is immersed in the water of 1 kg. How long the electrical heater has to be switched on to increase its temperature from 30°C to 60°C. (Specific heat capacity of water is (s = 4200 J kg–1 K–1)

31.Let the magnetic moment of a bar magnet be *pρm* whose magnetic length is *d* = 2*l* and pole strength is *qm*. Compute the magnetic moment of the bar magnet when it is cut into two pieces (a) along its length (b) perpendicular to its length.

32.A water molecule has an electric dipole moment of 6.3 × 10–30 Cm. A sample contains $10^{22}$ water molecules, with all the dipole moments aligned parallel to the external electric field of magnitude 3 × 105 N C–1. How much work is required to rotate all the water molecules from $\theta$ = 0o to 90o?

33.An inverter is common electrical device which we use in our homes. When there is no power in our house, inverter gives AC power to run a few electronic appliances like fan or light. An inverter has inbuilt step-up transformer which converts 12 V AC to 240 V AC. The primary coil has 100 turns and the inverter delivers 50 mA to the external circuit. Find the number of turns in the secondary and the primary current

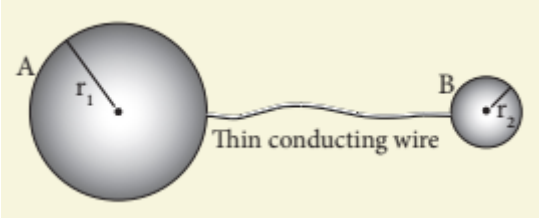
**SECTION – D ( 5 X 5 = 25 M_)**

**III.Answer ALL QUESTIONS :**

34 .a) Explain dielectrics in detail and how an electric field is induced inside a dielectric

**(or)**

b) Two conducting spheres of radius *r 1* = 8 cm and *r2* = 2 cm are separated by a distance much larger than 8 cm and are connected by a thin conducting wire as shown in the figure. A total charge of *Q* = +100 nC is placed on one of the spheres. After a fraction of a second, the charge *Q* is redistributed and both the spheres attain electrostatic equilibrium m a) Calculate the charge and surface charge density on each sphere. **(b)** Calculate the potential at the surface of each sphere.



35.a) State and explain Kirchhoff 's rules (with circuit diagram)

**(or)**

b)Explain Measurement of internal resistance of a cell by potentiometer

36.a) Explain the principle and working of a moving coil galvanometer

**(or)**

b) Find the magnetic field due to a long straight conductor using Ampere's circuital law

37.a) Obtain an expression for average power of AC over a cycle. Discuss its special cases.

**(or)**

b)How are the three different emfs generated in a three-phase AC generator? Show the graphical representation of these three emfs.

38.a) Explain the Maxwell's modification of Ampere's circuital law

**(or)**

b)(i) Write down the properties of electromagnetic waves.(ii) If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium